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Do We Know What We Are Doing?

The editor wrote a well-known fish-culturist here in the Southwest and asked him to contribute an article to The Fish-Culturist News. What he has to say is just about what all fish-raisers are beginning to find out. By omitting his name, we pass along to you what he thinks about the matter.

"... Have been out of town for some time and haven't had an opportunity to answer your letter which came together with the proof of your Fish-Culturist News.

"The News should prove very interesting and helpful to sportsmen as well as fish-culturists, if you can induce them to send in their ideas and information. My experience has been in the past that many fish-culturists are reluctant to give out much information for one reason or another. Perhaps they realize that in spite of all the gigantic propagation programs that have been in operation the past ten years, fishing gets no better fast. Making statements in print is likely to put many of us on the spot concerning results in terms of increased angling.

"There is no doubt in my mind that we have overdone the hatchery end of fish conserva-
(See No. 4, page 2)

Catch Your Brooders Out of Clean Streams

Since permission to print this story from the man who carried out the following experiment was not obtained, his name will be omitted, but due to the fact that the experiment worked so well, the information should be in the hands of all potential fish-culturists. It proves the value of catching broodstock from a good stream in order to save a feed bill and at the same time obtain larger spawns from the brooders.

Two female channel catfish were taken from a nice, clean stream. One weighed six pounds, the other four. The one weighing six pounds laid 32,000 eggs. The four-pounder laid 28,000. The young fish were measured when first hatched. One cubic inch will measure out 500 eggs or newly hatched channels. The broodstock held in holding ponds do not lay anything like that number of eggs.

No difficulty was experienced in getting the females to spawn. In fact they spawned within three days after being placed in the mating pens.

Therefore, to all would-be fish-raisers, catch your broodstock out of streams just before spawning time, and you will get far larger spawns, save a lot of time feeding, and also the cost of the feed.

What About the Prairie Chicken?

Why doesn't some individual try raising prairie chickens? During the past few years a large number of privately-owned quail hatcheries have come into being over the country. It seems that it would be an ideal time for some of these quail-raisers, or others interested, for beginning a prairie chicken hatchery. We don't know much about the prairie chicken, but old-timers tell us that they are easy to raise. Those who get in first would be in a position to make a great deal of money from the chicks by selling them for restocking purposes.

Would like to have some comment on this, especially from someone who knows something about them.

Rangers' Field Notes

The Fish-Culturist News will in each issue in the future carry a column devoted to the game rangers of the country. Rangers are requested to send in anything they have of interest. Rangers everywhere are invited to do this.

The Fish-Culturist News

PUBLISHED EVERY ONCE IN A WHILE

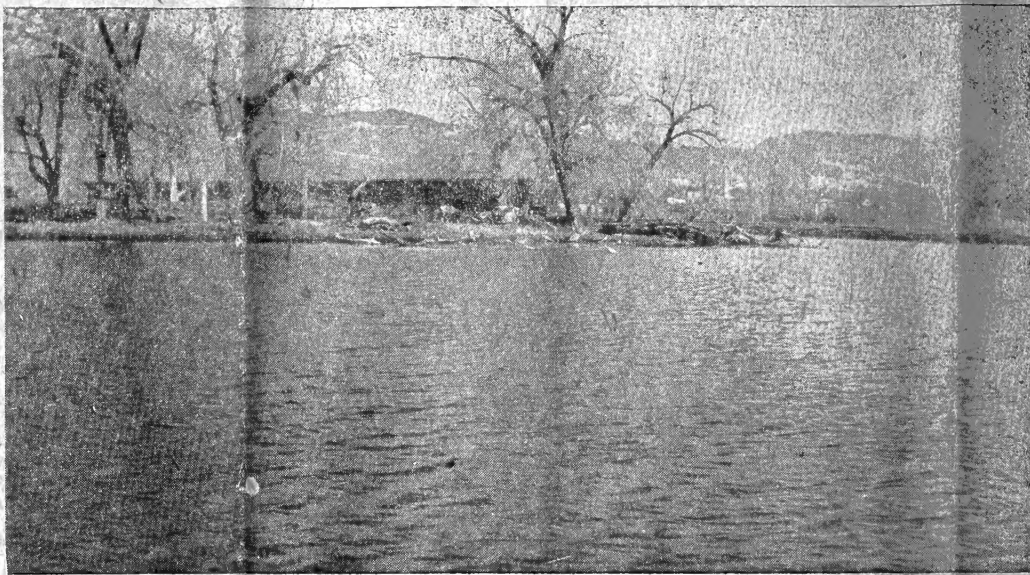
FIRST EDITION

DURANT, OKLA., P.O. Box 455

THOMAS J. RENICK, Publisher

Fish-Raisers Newspaper Begun

'The Old Fishing Hole' to Be Reclaimed by Colorado Sportsman



The lake pictured above is the "Ole' Swimming Hole" at Canon City, Colo., where Fred J. Singleton, as a boy, fished and skated, and which he has bought and reclaiming. What about your old swimming hole? Wouldn't you like to go back and fix it up, like Fred is doing? Chances are, you have a lakesite right on your own land that you could turn into a fine lake with just a little effort and money.

Fred J. Singleton of Pueblo, Colo., is a man now, but he remembers the days of his boyhood, and the old fishing hole. After a long number of years he has bought the lake in Canon City, Colo., in which he fished when he was a boy, and plans to drain, clean out, and restock with his favorite fishes. Such projects as Mr. Singleton's is one of the reasons for the publication of The Fish-Culturist News, and that coupled with the very interesting letter of Mr. Singleton is the reason he rates the front page of the very first issue of this little newspaper.

By reading the letter Mr. Singleton wrote which follows, anyone can see that he is a genuine, true-blooded sportsman, and if all the sportsmen of Colorado are of his caliber, then that state certainly has a lot of fine fellows.

What Mr. Singleton has done can be repeated a thousand times over by our people all over the country. There's many a lakesite just waiting for someone to build a dam to create a fine lake, and we believe that when our people awake to the possibilities of such projects they will build those dams.

Not only can the people raise fish for food and sport in their lakes, but also have sufficient irrigation facilities to raise a fine

(See NO. 3, page 2)

What Do You Know? about...

Forage Minnows

Some of you fellows who have been carrying on forage minnow experiments are requested to write of such and mail them to the editor. We know that minnows supply a large portion of the game fish's diet and that they are a natural food for all fish—so pass along all the information you can on the subject.

Red River Lake, Fishermen's Paradise

125,000 Acre Body of Water

During the fall months of this year, one of the nation's largest inland bodies of water will begin to form when the gigantic Red river dam watergates are closed. The lake is located between Durant, Okla., and Denison, Texas, just above U.S. highway 69.

Since the south bank of Red river is the boundary line between Oklahoma and Texas, confusion and discension have arisen over the manner in which it shall be permissible for sportsmen to fish and hunt. Oklahoma claims that it should receive the revenue from hunting and fishing licenses for all fishing and hunting north of the boundary line, and Texas claims her rights for revenue south of the line. Since the line will be under water, a sportsman cannot know for sure just where he is fishing.

The most logical and best suggestion yet to be presented is the one which would create a Red River Reservoir association. The hunting and fishing licenses would be sold, and the revenue used to promote the interests of the Red river lake. If such action were taken, the sportsman would simply go to the office at the lake and buy his license and would then be allowed to fish or hunt anywhere on the lake, without confusion.

Too, the state of Oklahoma or the state of Texas could not take the money derived from licenses and use it to build a fish hatchery in deep South Texas, or far in the interior of Oklahoma. We think the money should be used to develop the sporting and recreational facilities in the immediate area,
(See NO. 2, page 2)

Soil Conservation Will Help You Build Ponds

The Soil Conservation Service of the United States Department of Agriculture, cooperating with the Soil Conservation District, will give technical assistance to farmers and ranchers in surveying and construction of farm ponds so the pond will meet specifications for stocking with fish. The SCS keeps informed as to where fish may be secured for stocking of ponds. They have information as to the fertilization, care and management of the pond and fish for maximum production. Interested farmers may contact their local Soil Conservation District office for information on how the farm pond can help produce food.

Go Fishing and 'Unlax'

Fishing takes on added importance during war time.

First of all, fishing supplies recreation for everyone contributing to the war effort. Second, fish are food—vital food—which grows abundantly in waters in the USA.

Patriotically saving tires and gasoline, Fishermen are taking shorter trips—fishing nearer home. And they're discovering many good fishing streams and lakes. In fact, waters adjacent to populated areas have been more heavily stocked than ever before.

Angling for such species as catfish, carp, suckers, crappie, perch, bass, etc., is increasing in popularity as a result of the war. These fish are delicious food.

IS 'ZAT SO?

Because of poor vision and lack of insects fish find it difficult to feed during dark nights and are most apt to feed during the day—the opposite is true of bright light. Wonder who is authority for that?

Dedicated to Fish And Game Raisers

The need for a newspaper dedicated to gathering and disseminating practical information on fish-culture, both for food and recreation, is the main idea back of this little publication. The copy you are now reading is the first issue, and the publisher intends to print succeeding issues at such times as he has sufficient material to fill the columns.

Hunting and fishing stories and reports also will be included in the paper.

There is no set publication date as yet, owing to the fact that it remains to be seen whether or not the people interested in raising fish and building lakes are sufficiently interested in such a news-gathering medium. Present plans call for publication only occasionally. The next issue probably will be published some time in the coming winter.

This issue of THE FISH-CULTURIST NEWS has been printed and mailed at the expense of the publisher, in the faith that the people working at fish hatcheries, amateur fish-culturists, and lakeowners will send in their contributions to pay for following issues. Subscription price will be made known later.

There are hundreds of people wanting information on fish-culture and lake operation, and it is thought that by printing an occasional issue of THE FISH-CULTURIST NEWS such information can be gathered from those experienced in raising and handling fish and passed along to the interested parties.

There is another phase which might be developed if such information is made available to those interested. That is the fact that there are so many hundreds of suitable lakesites which might easily be turned into fine lakes, in which may be raised fish for sport and for commercial purposes. Not many people know that by buying a gamebreeders' license annually that they have the privilege of raising and selling game fish on the market just as though the fish were cattle. It is hoped that this newspaper will be able to help in this manner.

The FISH-CULTURIST NEWS will seek its information from men employed by the federal government and by the different states who operate fish hatcheries and who are experienced in all phases of fish-culture—from building culture ponds to releasing fingerlings in the open waters of the state's lakes and streams.

Build a Lake

The people of America are sleeping on their own rights by not turning into lakes every suitable available ravine, draw or natural basin which would require but a single dike in order to create a fine lake. It may be that the main reason they are not building lakes and raising food fish is because the possibilities have not been explained to them and consequently they do not know the potentialities of producing fish for commercial purposes. If this little sheet helps this cause, then the
(See NO. 1, page 2)

A few weeks ago the publisher wrote the state game and fish commissions of the different states and each commission responded nobly with the information sought. We wrote for the names and addresses of the superintendents of the state hatcheries and in most instances only a few days were required to receive an answer with all the information sought.

NUMBER 3—

However, you flatter me by asking me to write an article for your first issue, for after all, you know that is a bit out of my line. Not being a story writer, I shall just write this letter and give you a few highlights about our project and if you think there is anything in it worth printing, you are at liberty to do so.

When I was a boy in school we used to go to this lake to fish in summer and to skate in winter and at that time the owner of the property kept it up in good shape and kept the lake stocked with some very fine bass. It was not uncommon to catch bass weighing two pounds or better and there were plenty of them. The rowboats and other equipment were very good and the place was a sort of rendezvous for the pleasure seekers of the vicinity. However, as the owner was an elderly man when I first knew him it wasn't many years until he became quite feeble and naturally could not give the property the proper care and it gradually deteriorated until the lake was almost filled up with moss and debris and the boats were no longer useable.

Then last year the chance I had been waiting for came. The property was advertised for sale and my brother who lives in Canon City noticed the advertisement and called my attention to it with the ultimate result that we were able to negotiate a deal to buy the garden below the dam. Producing the family's own food at home is just now really coming into its own, and undoubtedly there will be much development along all lines of food production. The day is coming when fish ponds will be operated on a business basis. The fish raised, the lake drained, the fish harvested, canned and stored away for food.

"... Dear Mr. Renick: Received your most interesting letter and believe me your idea of the publication of The Fish-Culturist News is the best news I have heard late-

On a visit to the Lake Dallas hatchery a year or so ago, the editor was very much impressed by the presence of a large flock of ring-neck Canadian geese ("honkers"). They certainly made a beautiful sight wandering around over the green grass of the hatchery.

property.

(Ed.'s note: To drain a lake, let the water run down as low as is safe, wade in with a pitch fork and rake up the moss in piles. When the lake bottom has been cleared thus, finish draining.)

It should not be so difficult to clean and enlarge the lake after the water is out, providing the bottom is solid enough to carry the weight of the machinery. At any rate, we hope for the best, and I shall let you know later on just how we get along.

As time goes on we expect to acquire broodstock fish of some varieties so that we may raise our own stock and thus do away with the transportation problem. At this writing we have made arrangements with a hatchery in Denver for the purchase of some bass and crappie to be delivered this fall. We do however wish to contact someone who can furnish us with a few large channel catfish to be used for spawning purposes and would appreciate hearing from anyone who can furnish these fish.

I believe like you, Mr. Renick, that every suitable lakesite should be developed into a nice lake and that the time and money thus spent will bring dividends and a great deal of satisfaction to those doing the job and to those who come later.

You may rest assured that we will look forward to the issues of your publication and we will do our best to help you make it a success. Please feel free to write us at any time about anything which you think we might be able to get information on. There are a lot of good sportsmen out here in Colorado, and we should like to extend an invitation to you and any of your readers to pay us a visit in event they should visit Colorado.

Yours very truly,
Fred J. Singleton.

A great many of our citizens who are interested in fish propagation can increase their knowledge on the different processes used in fish propagation if they will visit thier nearest fish hatchery—either state or federal.

A CLIPPING ABOUT A GOOD GUY

(Write us a story, Chester, and give us the lowdown on all your activities. We have stories from several of the other fellows in your line next issue. Ed.)

When vacations come back to being an American custom, don't forget to include this great project on your itinerary if you are passing anywhere close to this area. Remember, your money help build the great dam which creates the huge inland sea.

tion. It takes nerve to admit that but it's the way I feel about it. We haven't paid enough attention to what kinds of fish are needed for each particular lake or stream, or how many or of what size, or even of what happened to them after we planted them. We have been going too fast on output to even think of what results were obtained from our efforts.

"We can't do much to improve on nature, and when our laws conflict with nature the fish haven't a chance. Not even in spite of big hatchery programs. We need a few hatcheries to provide the initial stock for new lakes, but annual dumping into old, overstocked lakes is a waste of time and money. I believe we need to expand our fish management program and go slow on propagation for a while. We need some more information on what we have, and what's happened to the fish we have been planting.

"I don't want to discourage the fish-culturists, but rather to encourage them to take stock of our situation and apply their knowledge of fish requirements to the lakes and streams, then see that the information gets to the powers that be so that a well balanced program can be devised. This blanket closed season, even on rough fish and enemies of game fish doesn't seem to be very sound. It's discouraging to try to do things when the law forbids. Especially with the meat situation as it is, and the interest that has been worked up in the utilization of rough fish for sport and food.

"I shall attempt to drop you a few lines soon as time permits. The best of success with your News, and regards to fish-culturists everywhere."

The most important problems involved in raising fish in farm ponds are the production of food and the management of the fish population so that the correct number of fish are present to utilize efficiently the food produced.

After the fish used in stocking a pond have spawned once, more small fish are present than can adequately be supported by the food which the pond is producing. Hence, a pond rapidly reaches its maximum carrying capacity, usually within one year. If the number of fish in a pond remains the same after the first year, an increase in the average size of these fish is impossible unless the food supply is increased.

Fish-pond management involves more than proper use of commercial plant food. The other essentials are proper stocking of new ponds, methods of stocking, management of old ponds, sources of fish for stocking, fishing and control of weeds.

It has been recommended that

publisher will feel that he has been amply repaid for the expense and effort he has put forth.

Undoubtedly the succeeding issue will be much more informative than this one, as we expect to have many more articles contributed by our fish hatchery friends and researchers. If the men of our hatcheries will just sit down and write of some experience they have had and send it in, we feel sure that such articles will prove of immense value to both the expert fish-culturists and to the beginners.

If you have, fire them in and we will run them in the columns of The News. There should be a lot of the fellows who know the answers.

Time of Applications

Shortly after an application, the water usually becomes murky or green or brown (brown if cottonseed meal is used) due to the presence of microscopic plants. Succeeding applications should be made whenever the water begins to lose the green or brown color and begins to clear up sufficiently for the bottom to be seen in 2 feet of water. The fertilized pond will usually require an application from two to four weeks. The last application should be made along in September or October. The annual cost per acre will vary from \$11 to \$25.

For best results the pond should be fertilized throughout the growing season. For warm water fishes the growing season usually lasts as long as the water is above 68 degrees. Ponds which receive water from rich land require less fertilizer than ponds located on poor soil.

For small ponds, fertilizer can be broadcast from the bank over the shallower portions. You need not cover the pond completely as waves will distribute the microscopic life produced. For fertilizing larger lakes, a boat is a necessity. Just paddle the boat along and pour the fertilizer from the containers. Place the fertilizer in the areas of the lake where the water is from 1 to 6 feet deep.

The cost of producing fish in fertilized ponds is from 3 to 6 cts. per pound.

A 10-acre lake will furnish all the fishing that 50 families will want to do, and yet not be fished sufficiently to prevent some of the fish from becoming oversize and requiring too much food.

A regulated program of fertilization will kill out moss in lakes.

Minnow and tadpole production also can be increased unbelievably by following the fertilization procedure.

A patch of lespedeza cerasa should be planted above the pond to trap the silt. Plant Bermuda on the water shed.

Since fertilization of fish ponds has been carried on some wonderful results have been obtained by some of our hatcheries. We are asking those who have tried it to write of your experiments and send them to us for future publication. This will pass along some very valuable information from one hatchery to another, and also to our private lakeowner friends, and to all prospective fish-culturists. It works wonders, and we are anxious to learn your results.

Such a column will prove interesting reading to all concerned, and at the same time a lot of answers and different opinions will be mailed in.

DO YOU have a lakesite on your property? . . . a site that will impound as much as four or five acres of water? If you do, why don't you build a dam, and create a nice body of water? It would be worth the time, effort, and expense, even if you had to build four dykes to create a lake; but if you have to build only one dam to make such a lake, then it certainly would be worth your time and effort.

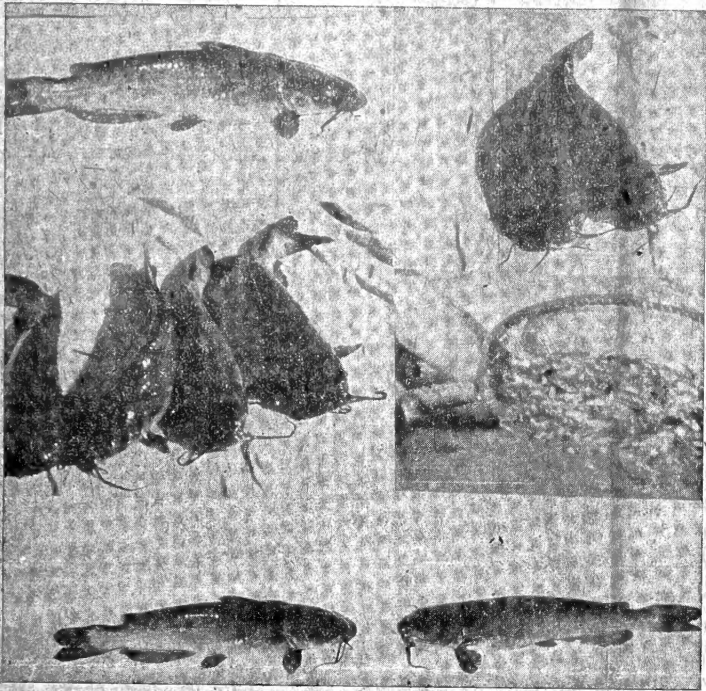
How Channel Catfish, the Tacklebusters, Are Raised

Since the Channel Catfish has long been an under-rated game fish, and now is rapidly gaining the favoritism of the sportsmen, the following article is published in the furtherance of this fish's popularity.

SUPPOSING that you have caught the broodstock out of a clean stream of water, the story of the process of raising Channels will start at that point.

Brooders weighing from 2 to 10 pounds, free from disease, with the male a little larger than the female, should be paired off and placed in a spawning pen, size approximately 7x10 feet. The spawning pen is built on a slope around the edge of a pond. The fencing can be either half-inch mesh hardware cloth, or made with wooden slats such as plaster lathes. The hardware cloth is better because the mesh size mentioned will keep out snakes and other enemies which might disturb the brooders.

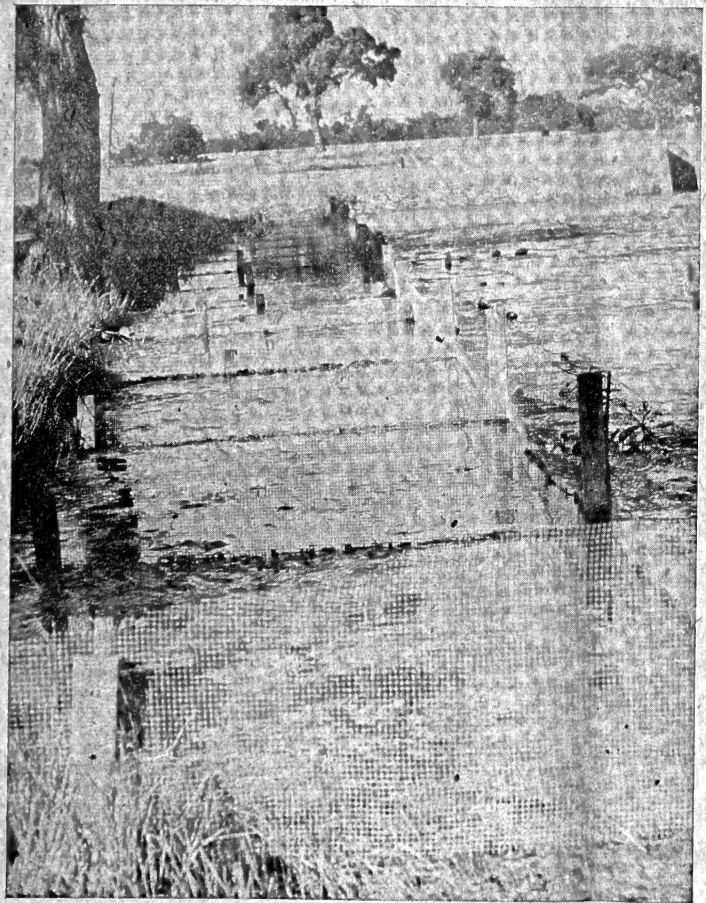
In the center of the pen a ten- or 15-gallon crock shaped in the fashion of a nailkeg is staked down, with the top of the crock about ten inches below the surface of the water. The nest crock should be level. This is done by sinking the rear end of the keg in the ground



The above pictures show typical specimens of Channel Catfish Broodstock. Nice, clean, oily-looking adults are what you want.

to make the container sit level. The mouth of the crock is turned to face the center of the lake.

When the temperature of the water has risen to around 70 de-

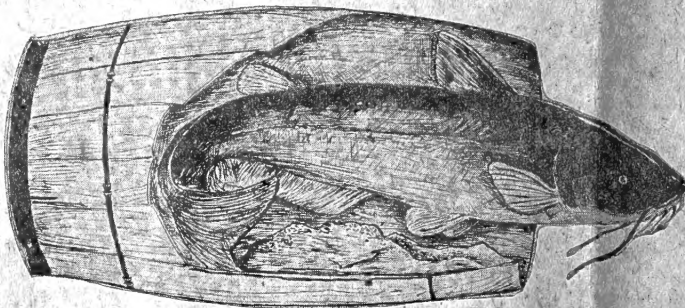


The above picture shows spawning pens built around the edge of the pond. In the center of the pen, a nestbox is staked down. The depth of the water runs on a slope from zero to three feet.

grees, the male will clean the crock, and then the female enters to deposit her eggs. The male fish then takes over the job of sitting on the nest and guarding it. This is the manner in which he fertilizes the eggs. Some fish-culturists have found a milkcan of the large 20 gallon size suitable for large broodstock.

The nest should be inspected once or twice a week. When it is found that the eggs have hatched and the young fish have taken on a milky color, the young fish should be poured out into a wooden trough containing running water. In pouring the fish there will be some of the little fellows clinging to the sides of the crock. Don't pick them out with the fingers. Put a little water in the crock and rinse them out.

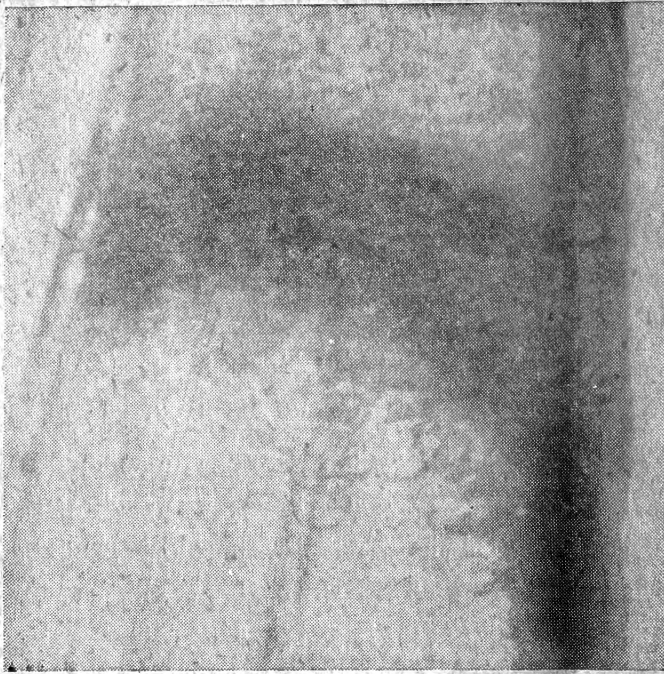
The wooden trough used is made with 2x12 boards on the order of a horse trough. The trough is placed below the dam of a pond and a rubber hose is run from the water of the lake over the dam and into



The picture above shows "the old man" "doing his stuff" on a spawn of eggs. If sportsmen doubt his gameness, they should place a hand around near the nest. The channel is the strongest fish there is.

one end of the trough. An ordinary garden hose will do. Too much force should not be allowed to run into the trough. Just a nice small, weak stream. Or if a spray can be rigged up that is just as well. In the end of the trough opposite the end where the hose is attached, a hole large enough to permit insertion of a half-inch pipe is bored. The pipe is placed in the hole and the upper end is placed where the waterlevel is to be maintained. A screen gate is placed about one foot up the trough from the pipe to prevent the fish from going out the pipe.

When the young fish have absorbed the egg sacks clinging to them they are given a few pinches of dry powdered milk with a small portion of dried egg yolk added, or meatscrap meal. Feed very very lightly. If you watch the young fish closely, you will see them spread out over the bottom of the trough. This is the sign they are ready to be fed. A tablespoonful will feed a large spawn for the first few feedings. Use a hose to sypher unconsumed food, half an hour after feeding. Keep the trough clean.



Although this picture was made of a spawn under water, you can get at least some idea of how the little fellows look, after "the old man" has guarded the nest. A spawn of fish like that pictured would stock a 25-or 30-acre lake, and within a few years would provide enough fish to feed 20,000 persons.

When the young fish have been in the trough about five days, place them in a washtub containing water and carry them to the culture pond. Any size pond will do.

Make a "shelterbox" in this way: Take three 1x12 boards three feet long. Looking at them from the end they will be in the shape of the letter H. The board nailed in between shave have a one-inch block nailed at each end to leave an opening so the young fish can pass under. On the outer sides, use a strip of half-inch hardware cloth.

When you have taken the young fish from the trough take them to the culture pond and place a little feed in the sides of the shelterbox. Then pour the small fish into the side of the box. They will "take up" with the shelterbox and use it for protection and shade. The water in the culture pond is from 2 to 4 feet deep. An area approximately ten feet square is sanded to a depth of about five inches. The shelterbox is staked down in the center of the sanded area.

If you cannot buy meatscrap meal, or powdered milk, raise the

Tribute to Fish Hatcherymen

Our hatchery superintendents and other hatchery employes have received very little credit for the fine work they have been doing for a great number of years. Now, with fish-culture by numerous lakeowners just over the horizon, the knowledge and experience of our hatcherymen will be of inestimable value to the new fish raisers. We have found that hatcherymen are always courteous and very cooperative with our citizens who are seeking information relative to fish-raising, and this little sheet wants to say "Thanks" and offer its praises to all hatcherymen everywhere.

If you hatcherymen have information which you will pass along, sit down and write what you have in mind. If you want your name left out of the story, just say so, and that is the way it will be. We will be mighty glad to print anything you have to say in regard to fish-raising or betterment of conservation.

Power to all of you in your efforts. Keep up the good work!

Lakes Furnish Most Fish

STILLWATER, Okla. (Special)—Most people have the belief that in order to go fishing and be assured of success it is necessary to travel miles over rough roads to the most inaccessible streams or lakes in wilderness areas, says Dr. F. M. Baumgartner, wildlife specialist at the Oklahoma A. and M. college.

"Although it is quite true that such efforts are sometimes rewarded by big catches," he continues, "such trips often result in a water haul and the disgruntled nimrod returns home tired and disappointed."

Careful studies made on the number of pounds of fish caught in the various streams and lakes indicate that in general lakes and ponds produce more fish than are raised in rivers and creeks.

For example, properly stocked ponds located in fertile soil have yielded 100 to 300 pounds of fish per surface acre over a period of several years while it is an exceptional stream from which more than 50 pounds of fish can be taken per acre.

(See fertilization story elsewhere in this issue of the Fish-Culturist News.—Editor.)

Although the reasons for this difference are not clearly understood, a number of factors are believed to contribute. For example, Baumgartner explains, the water temperature in lakes and ponds is usually several degrees higher than that in running water and this means that the growing season for fish food is longer. Furthermore still waters do not destroy the animals and plants that fish require for food and shelter.

During times of high water particularly, streams scour their sides and bottoms and destroy the necessary food and shelter. Oftentimes spawn and young fish are carried away by high waters that occur during the season at which most fish are producing their young.

Because of these conditions, our warm water ponds and lakes that lie close to home, particularly those that are not subject to great fluctuation in water levels, will usually yield more fish to the angler than the remote stream or mountain lake.

WANTED—Fishing, hunting stories, lies, pictures, cartoons, and names and addresses of sportsmen.

One of the largest quail crops Southeastern Oklahoma has seen in a good many years, has been reported by numerous sportsmen in this section.

young fish in a fertilized pond.

Keep the young fish in the culture pond until fall and then release them in your favorite stream or lake.

Aquatic Plants in Relation to Game Fish

Naturalist Points Out the Necessity of Plants in the Water, if Fish Are to Have Food

By WILLIAM O. COON, Naturalist

THE number of game fish that can live in any body of water is dependent upon the nature of the living conditions that exist within those waters. Also the size of those game fish is governed by those water conditions.

Aquatic Plant Life in a body of water is equally as important to fish life as the vegetation that grows upon the upland is to the animal life that lives in the woods or fields.

The basis of all food for every living creature is plant life. From the human being to the lowest form of animal life are dependent upon vegetation for their existence. Even though one species is carnivorous and may feed upon another carnivorous creature, somewhere down the line there are those that are dependent upon vegetation.

Game fish within most lakes are imprisoned within those waters. It is the plant life that grows within those waters that create the proper balance for their living condition. The advantages of that vegetation are many. A sportsman may curse and condemn the weeds—that entangle his fish line or snag his lure, but without those weeds the fish cannot grow to a healthy pan size for eating or give that sportsman the thrill he gets in catching him.

Whether it be fish life, bird or animal life—there are but three fundamentals that concern them. First is to obtain food; the second is protection from their natural enemies; and the third to reproduce. Let's just touch on the basic facts concerning each of these.

FOOD FOR GAME FISH.—All fishes classified as game fish are carnivorous creatures (meat eaters), some of them are cannibalistic and feed upon the smaller of their own kind. Many game fishes feed upon other species of game fishes, rough fish and otherwise. There are certain species of small fishes that never grow large and which multiply rapidly that are known as forage fish. It takes an abundance of small fish to provide food for large numbers of larger fish, and, therefore, to have an abundance of small fish they likewise must have a greater abundance of food.

These smaller species of fish are dependent for their food upon the microscopic animal life that lives in the waters. One drop of water may contain numbers of small creatures visible only when placed under a microscope. They are not harmful to man or beast, but are important to those fish. This small animal life may, depending upon the species, be dependent upon the living plants that grow in those waters or the decaying foliage and roots of old dead vegetation. Perhaps this small microscopic creature may also be carnivorous and feed upon other smaller species of tiny creatures, but somewhere down this line if traced to its source, the plant life provides that food that enables one to live upon the other.

HERE we will consider protection for these fishes from their natural enemies. The parent fish takes its young into the weed bed, not only because food is more abundant there, but because it affords hiding places among the dense growth. A bird takes its young into the brush, vines or trees; a deer seeks the dense forest; a mountain creature a cave beneath a lofty cliff; the ground creature in its burrow. Fishes depend upon aquatic vegetation, dead branches or tree trunks, over-hanging banks and beneath the edges of rocks, depending largely upon the species, but plant life affords the most deal place.

There are many other advantages to a proper balance of aquatic vegetation in those waters aside from food and cover for game fish. These are truly important but too numerous to explain about all of them. However, may we touch on a few of those which are most important.

You have heard of people being locked in a vault and dying from suffocation, due to using all of the oxygen from the small space of air therein. You know that people cannot exist in the absence of oxygen, neither can any creature with blood in its veins. Surely you know that when your lungs take the oxygen from the air, that it's the vegetation upon the earth that lives upon this used air and puts back into it that oxygen so essential to our existence. Plant life in the water does exactly the same for those game fish imprisoned therein. Should there exist a shortage of oxygen, the tiny fish will perish first, the same as a babe could not exist as long as a healthy adult. Should a million of these fish die in your lake, you would be unaware of it. The tiny creatures would be consumed by the bird life along the shores, and were they not, you could not locate them without a micro-

scope or if you knew exactly what to look for.

While game fish have no lungs, they do have blood and require oxygen. They take the oxygen directly into the blood stream through the tender tissues of the gills. This oxygen is most abundant among the vegetation, that is a second reason why that the adult fish takes its young there to live.

PLANT LIFE aids in the purification of the waters. It takes up the poisonous carbon dioxide gases given off by the decomposing bottom soils. At the same time this aquatic vegetation aids in the clarification of the waters. It collects the floating particles of sediment washed from the surrounding highlands. One seldom ever sees a weedy lake with other than clear waters which are best for fish life. Lakes barren of vegetation are often roiled by turbid waters. Game fish in muddy waters often acquire a muddy taste.

Time and space will not permit us to go further into this subject. Let us now consider the third and last fundamental concern of these wild creatures—

REPRODUCTION.....

Provide a suitable living quarters with plenty of food, and they alone will take care of the reproduction.

Game fish do select a mate each year, some make a bed and lay their spawn. Let's consider the Large Mouth Black Bass, a hardy and game fellow. After mating, the female will fan the bottom, either to firm clean soil or a net-work of aquatic roots. Here she deposits her eggs and in the meantime, the male guards and protects her. Now the male takes charge of the bed and fertilizes the eggs and guards them until the small fry are hatched. Each bed may contain from 2,000 to 200,000 eggs. When the fry are hatched, the male protects them and takes them into a weed bed where food is plentiful, hiding places abundant, and oxygen sufficient. After caring for them a few days, he again is over-come with that cannibalistic instinct and may turn on the very fish he has been protecting. The fear of fish then causes him to leave the shallow water weed bed and move to the outer edges near open water where he can more readily observe the approach of his enemy. Here he lives on through the summer and fall awaiting for the smaller fish that venture into the open that he may feed upon them, but still near cover where he may hide as well as find the shade protecting him from the sun.

That's the place to drop your lure for the big fellows at the edge of the weed bed. Lay that plug on a lily pad and with a little flip of the rod, make it jump into the water and keep it moving with a life-like action. You will get him and he will give you a thrill. Each big one you take gives more smaller fish a chance to grow to maturity.

Editor's Note: The writer of this article is a nationally recognized authority on the development of better hunting and fishing grounds. Mr. Coon, a naturalist by profession, is the owner of the GAME FOOD NURSERIES, P. O. Box 371X, Oshkosh, Wisconsin, one of the originators of a business most important to conservation activities by supplying the necessary aquatic plants to provide food and cover for planting in lakes. He offers a very helpful booklet free of charge. (Thank you, Mr. Coon, for the foregoing article, and we hope you can find time in the future to write more articles for The Fish-Culturist News.)

YOU Can Raise Bullfrogs

Ed's Note: Vol Brashears, over at Berryville, Ark., is the kind of fellow most sportsmen admire. He hunts and fishes, saws lumber, sells hardware . . . and . . . raises bullfrogs. He knows his frogs and how to raise them, and if you were to write him a letter, you probably would get something about like the following:

I am always glad to give information on anything I can. We operate a hardwood lumber manufacturing plant, producing and shipping wagon, truck and farm machinery wood repair parts to 16 states. Helping the farmers to produce more food now during this war, pleases me very much.

I raise frogs and fish as a sideline or hobby, for our use, pleasure and profit. There has been such a

demand for frogs for several years that I usually eat the fish and sell the frogs for restocking and scientific purposes, also because, the frogs show a nice profit each year with very little expense or trouble to me. I now offer frogs for sale so other people can get started in this interesting business of producing more food.

The other things I raise are rabbits, bees, chickens, fruit, garden, everbearing strawberries, etc. I believe in producing more than I use so I will be a help to my country and friends.

To raise giant jumbo bullfrogs is no difficult if you understand all they require is proper food and protection. They are helpless, have no way of defending themselves and their life from beginning to end depends upon their ability to hide and stay hidden until all danger is over. For this reason, they prefer to sit on the bank near the deep water edge with something

The Publisher



THOMAS J. (Chick) RENICK

Just in case some of you fellows wonder what the publisher of this little sheet looks like, well here he is . . . classification 2B . . . Linotype operator by trade . . . fisherman by choice . . . conservationist by instinct.

like a tree or log to make shade and protection for them, jumping in when they sense danger.

Frogs feed at night in shallow water usually one to three inches deep. Their principal food is crayfish, which must be alive. Frogs eat what insects they can catch such as millers, gnats, mosquitoes, grasshoppers, etc.; but no dead food of any kind. Like gamefish, they eat small frogs so they must have either sufficient room to give protection or fences to separate large frogs from small ones.

Everything from birds to man is their enemy. It seems that their choice, white delicate meat is desired by fish, ducks, geese, mink, coon, foxes, and man. So the Creator of all good things, knowing this, made it possible for one large female frog to lay 5,000 to 20,000 eggs per season usually between May and July. So, you see, two pairs to one dozen gives you the necessary breeding stock for a pond, creek, river or lake. Eggs or spawn hatch in six to 21 days, according to the temperature of the water. Every sportsman in America should do himself, his country, his children or grandchildren a favor by releasing at least one pair of Jumbo bullfrogs in his favorite fishing water. We all know that to grow a crop, we must plant the seed.

Frogs hibernate in holes in the ground or in the mud in the bottom of ponds in late fall and do not eat or come out until spring—usually March or April. You can raise fish and frogs in the same pond, if you partition off water so large frogs and large fish are together and small frogs and small fish are together.

To raise large numbers of frogs, build your fence at least five feet high—not at water's edge. Back up whatever distance you think best to give them plenty of bank room. Plant watercress and water moss in the water so it will grow. This gives protection to frogs, tadpoles, crayfish, fish, etc., gives off oxygen, and makes food for fish, crayfish, tadpoles. Next, stock well with crayfish which will eat anything. Multiplying rapidly, they supply the frog food.

Any kind of fencing will do that will keep them in and their enemies out. If you should use wire, put something on the wire so they can see it and not jump into it and hurt themselves. Shade is essential.

(See Fertilization story concerning feed for tadpoles).